REMARKS

Claims 1-36 are pending in the present application. Claims 9-21 and 32-36 are cancelled above. Claims 1, 7, 22 and 27 are amended above. New claims 37-50 are added above. No new matter is added by the claim amendments or new claims. Entry is respectfully requested.

Applicant affirms the election of Group I, Species I, which includes claims 1-8 and 22-31. Claims 9-21 and 32-36 are canceled above without prejudice to the filing of divisional or continuation applications.

Applicant notes with appreciation that the Office Action indicates at page 5 that claims 23-31 are allowed and that claims 6 and 8 would be allowable if rewritten in independent form. New independent claim 37 includes the limitations of original claims 1 and 6. New independent claim 44 is amended above to include the limitations of original claims 1 and 8. Entry and allowance of the new independent claims and claims dependent thereon are respectfully requested.

Applicant notes that the Office Action Summary does not indicate whether the drawings filed in the application are acceptable. Confirmation of their acceptability is respectfully requested.

Claims 29-35 are renumbered above in accordance with suggestions made in the Office Action at page 2, paragraph 3. Entry of the renumbered claims is respectfully requested.

Claim 27 is objected to for an informality. Claim 27 is amended above in accordance to suggestions made in the Office Action at page 2, paragraph 4. Entry is respectfully requested.

Claim 7 stands rejected under 35 U.S.C. 112, second paragraph. Claim 7 is amended above in a manner believed to overcome the rejections. Entry of the amendment and removal of the rejection are respectfully requested.

Claims 1-5, 7 and 22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Govzman, *et al.* (U.S. Patent No. 5,957,751 - hereinafter "Govzman"). Accordingly, reconsideration of the rejection and allowance of claims 1-5, 7 and 22 are respectfully requested.

The present invention of amended independent claim 1 is directed to a head for polishing a wafer comprising a carrier, a retainer ring, a supporter, and a membrane. The retainer ring is disposed on a lower edge of said carrier. The supporter is disposed in said carrier configured to provide first and second chambers separated from each other. The supporter includes a surface portion having a flat surface, a plurality of first holes communicating with said first chamber, and a plurality of second holes communicating with said second chamber. The membrane encloses said surface portion of said supporter. The membrane is spaced apart from said surface portion, and has a plurality of third holes corresponding to said first holes. When a vacuum is applied to the first chamber, and supplied through said first holes and corresponding third holes, a wafer in proximity to the membrane is drawn by the vacuum through the third holes toward said head.

The present invention of amended independent claim 22 is directed to an apparatus for polishing a wafer comprising a supporting portion having an abrasive pad disposed thereon and a polishing head disposed over said abrasive pad. The polishing head comprises a carrier, a retainer ring, a supporter, and a membrane. The retainer ring is disposed on a lower edge of said carrier. The supporter is disposed in said carrier configured to provide first and second chambers separated from each other. The supporter includes a surface portion having a flat surface, a plurality of first holes communicating with said first chamber, and a plurality of second holes communicating with said second chamber. The membrane encloses said surface portion of said supporter. The membrane is spaced apart from said surface portion, and has a plurality of third holes corresponding to said first holes. When a vacuum is applied to the first chamber, and supplied through said first holes and corresponding third holes, a wafer in proximity to the membrane is drawn by the vacuum through the third holes toward said head.

In the present invention as claimed in amended independent claims 1 and 22, "when a vacuum is applied to the first chamber, and supplied through said first holes and corresponding third holes, a wafer in proximity to the membrane is drawn by the vacuum through the third holes toward said head." This feature is illustrated by way of example at least at Figs. 5, 6A and 6C of the present specification. In this example, the membrane 170 has a plurality of third holes 172 corresponding to first holes 156 to absorb and hold the wafer 10 under vacuum during the loading step (see FIG. 6A) and/or the chucking step (see FIG. 6C) of a wafer polishing process (see Figs. 5, 6A and 6C and page 11, lines 9-11 of the present specification). To achieve this, in the loading step and/or the chucking step, gas is output through a first fluid passage 134a to make a first chamber 160 vacuous, and through a second fluid passage 134b to make a second chamber 136 vacuous (see FIGs. 6A, 6C, and page 12, lines 10-13 and page 13, lines 2-5 of the present specification). Since the first chamber 160 communicates with both the first fluid passage 134a and the "plurality of first holes" 156 (see page 10, lines 18-19 of the present specification), and since a "plurality of third holes" correspond to said "first holes," it therefore follows that the "vacuum" is supplied "through said first holes and corresponding third holes." In this manner, "a wafer in proximity to the membrane is drawn by the vacuum through the third holes toward said head."

The Govzman reference is cited in the Office Action as including an aperture, or plurality of apertures, in a center region of the Govzman membrane. The Govzman aperture or apertures are used as a sensing mechanism for sensing the presence of the substrate. The Govzman apertures do not provide a substrate lifting mechanism for drawing a substrate toward the head by use of a vacuum, as claimed in the present invention. In particular, Govzman, fails to teach or suggest a membrane that has a "plurality of third holes" that correspond to "first holes" that are formed in the supporter of the head. Instead, in Govzman, the membrane aperture or apertures 276 are formed in a central region of the head, and the Govzman membrane apertures do not "correspond" to the plurality of holes 260 that are formed in the Govzman support structure 114. The Govzman membrane apertures 276 do not correspond to holes 260 because the Govzman membrane holes are not used in furtherance of a substrate loading or chucking function, in which

the substrate is drawn in a direction toward the head, as claimed in the present invention. Instead, the Govzman membrane apertures serve a substrate sensing function, a function that is entirely different than that of the present invention. For this reason, it is not desirable in Govzman to align the membrane holes with the first holes in the support structure, since such a configuration would not lend itself to a substrate sensing operation.

In addition, Govzman fails to teach or suggest "when a vacuum is applied to the first chamber, and supplied through said first holes and corresponding third holes, a wafer in proximity to the membrane is drawn by the vacuum through the third holes toward said head," as claimed in amended independent claims 1 and 22. Instead, Govzman discloses a carrier head 100 comprising a substrate backing assembly 112, which includes a support structure 114 and a flexible membrane 118 (see Govzman, FIG._5A and column 9, lines 9-13). A plurality of support structure holes 260 (referred to in the Office Action at page 3 as a "plurality of first openings") extends vertically through a support plate 250 of the support structure 114 (see Govzman, column 9, lines 19-20). In addition, a small aperture or plurality of apertures 276 may be formed at the center of membrane 118 (see Govzman, FIG._4 and column 9, lines 34-35). The small aperture or apertures 276 are used to sense the presence of a substrate (see Govzman, column 9, lines 36-38). In addition, during the loading step of Govzman, the substrate is loaded into the substrate receiving recess 234 with the backside of the substrate abutting mounting surface 274 of the flexible membrane 118 (see Govzman, FIG._4 and column 10, lines 10-12).

There is no teaching or suggestion in Govzman that the membrane aperture or apertures 276 "correspond" to the Govzman support structure holes 260. Moreover, Govzman teaches the use of a small aperture or apertures in a center region of the membrane for the purpose of sensing an applied substrate. Govzman fails to teach or suggest that a "vacuum" is "supplied through" said "third holes," such that "a wafer in proximity to the membrane is drawn by the vacuum through the third holes toward said head," as claimed.

In view of the above, it is submitted that Govzman fails to teach or suggest the invention

set forth in amended independent claims 1 and 22. In particular, Govzman fails to teach or suggest "a plurality of third holes corresponding to said first holes," as claimed in amended independent claims 1 and 22. Further, Govzman fails to teach or suggest that "when a vacuum is applied to the first chamber, and supplied through said first holes and corresponding third holes, a wafer in proximity to the membrane is drawn by the vacuum through the third holes toward said head," as claimed in amended independent claims 1 and 22. Reconsideration of the rejections and allowance of independent claims 1 and 22 are therefore respectfully requested. With regard to the various dependent claims, it follows that these claims should inherit the allowability of the independent claims from which they depend.

Closing Remarks

It is submitted that all claims are in condition for allowance, and such allowance is respectfully requested. If prosecution of the application can be expedited by a telephone conference, the Examiner is invited to call the undersigned at the number given below.

Respectfully submitted,

Date: February 8, 2005

Mills & Onello, LLP
Eleven Beacon Street, Suite 605
Boston, MA 02108
Telephone: (617) 994-4900, Ext. 4902
Facsimile: (617) 742-7774
J:\SAM\0225DIV\amenda\amendmenta4.wpd

Anthony P. Onello, Jr.
Registration Number 38,572
Attorney for Applicant